

HIPOTRONICS

INC.
BREWSTER NEW YORK

"High Potential Electronics"

CORONA DETECTOR
MODEL NO. CDO-68C

Model CDO-68C is a precision-engineered instrument designed specifically for the detection and measurement of low levels of Corona.

The set consists of three separate functions integrated in a single unit.

A line-triggered oscilloscope with 5" CRT, X-Y recorder output provision

A multi-range pulse calibrator,

A triple-range, peak-reading, RMS-calibrated KV Meter (optional)

SPECIFICATIONS:

Scope

Input	115 VAC 1 amp, 50/60 HZ
Display	Straight line or elliptical on 5" flat faced CRT class "A" or class "C" amplified trace-locked to input frequency
Graticle:	Illuminated, with centimeter divisions
Sensitivity	Greater than 5 microvolts/CM
Band Pass	Narrow Band - AEIC-30 KHZ $\pm$ 10 KHZ resistance - capacitance bandpass shaping. 30 KHZ $\pm$ - slot filter in amplifier 70 KHZ $\pm$ - slot filter in amplifier

Pulse Calibrator

Input	115 VAC, 30 ma, 50/60 HZ
Output	1,2,4,10,20,40,100,250, Picocoulombs when coupled to a 100 PF. injection capacitor

SPECIFICATIONS, Cont'd:

Pulse Shape 200 u-sec wide, 5 n-sec. rise-time variable phasing

SCOPE CONTROLS & FUNCTION:

Horizontal Position Set trace to desired position on CRT
Vertical Position

Straight Line Horizontal sweep will be a straight line

Ellipse Horizontal sweep will be an ellipse with major axis in the horizontal plane

Rotate Ellipse The peaks of the wave will be rotated approximately 90° .

Sensitivity Sets vertical sensitivity so that vertical display can be set to desired deflection

Astigmatism Adjust linearity of line width over entire trace

Scale Illumination Sets brightness of graticle

Band Select Switch Selects input center frequency 30 KHZ 70 KHZ, narrow band

Focus Adjusts sharpness of trace

Intensity Sets brightness of trace

AUXILIARY CONTROLS ON REAR OF SCOPE:

Class A - C Provides for Class "A" amplification of input (100% of signal displayed) or class "C" (signal clipped at base line).

Atten. Attenuates the signal to 1/10th its actual size, provides for full display of large-amplitude signals

PULSE GENERATOR SECTION:

Range Switch Selects calibrating pulse in 8 steps, 1 pc to 250 pc

Trigger Phase Varies calibrating pulse position on CRT

INSTALLATION:

After positioning the unit, make the following connections:

1. Using RG-58u cable terminated in UG-88 C/U Connectors, connect "Scope Input" at rear of scope to a 3000 Pf capacitor (power separation filter) with a voltage rating as high as test source.
2. Connect "Calibrator" to a 100 pf pulse injection capacitor rated at test voltage.
3. Use of an Hipotronics conditioning circuit is required if an X-Y recorder is to be used with the scope.

OPERATION:

A. Preliminary Control settings:

1. Rear of unit
Set attenuator switch UP (off).
Select class "A" operation.
2. Front Panel
Set horizontal position, vertical position,
Astigmatism, scale illumination controls at midpoint.
Set 'straight line - ellipse' switch to ellipse position.
3. Turn scope on and allow to warm up for 10 minutes
4. Center trace with Horizontal and Vertical controls
5. Adjust Astigmatism, Focus, and Intensity Controls for maximum trace definition.

B. Connect the test sample into the system.

OPERATION, Cont'd:

C. Calibration:

1. Turn calibrator on. Select a pulse level equal to maximum allowable Corona level.
2. Set the "Straight line - Ellipse" switch to straight line. Use sensitivity, vertical position and horizontal position controls to bring the calibration pulse between two of the horizontal graticle lines.
3. This display now represents the Corona test facility as a system, including the test sample, in a no-voltage state. Set the "Straight line- Ellipse" switch to "Ellipse" for greatest clarity of display in testing.

The high voltage supply may now be turned on and brought up to operating voltage. As voltage is raised, note voltage at which Corona appears as vertical spikes on the trace. This voltage, is termed the "inception value". Assuming that the pulse injection capacitor used is of proper voltage rating, and the calibrator is left on, the Corona obtained at this point may be compared directly to the calibration pulse.

As voltage on the sample is lowered, the Corona display will suddenly disappear. This is the "Extinction value".

CALIBRATION AND ADJUSTMENTS:

A. Scope Section:

1. Horizontal gain adjustment:
 - a. Set "Ellipse - straight line" switch to straight line. Set "Ellipse Rotate" to "Rotate" position. Adjust A4R3 (Horizontal Gain pot nearest rear of unit) so that horizontal display covers 10 Graticle divisions.
 - b. Set "Ellipse Rotate" to its unmarked position. Adjust A4R2 (Horizontal Gain pot, nearest front of unit) so that horizontal display covers 10 graticle divisions.

CALIBRATION AND ADJUSTMENTS:

A. 2. Ellipse Angle Adjustment:

- a. Set "Ellipse - Straight Line" switch to ellipse.
- b. Adjust A4R7 (Ellipse Angle Adj.) so that the ellipse is parallel to Horizontal plane

3. Ellipse Size Adjustment:

- a. Set "Ellipse-Straight Line" switch to Ellipse.
- b. Adjust A4R6 (Ellispe Size Adj.) for a $2\frac{1}{2}$ division vertical opening of Ellipse

4. Gain Trim Pot (A3R5) Adjustment:

- a. This adjustment is factory set and should not have to be moved unless components nearby schematically have been replaced. The trim pot may be adjusted to give greater gain, but in no case may it be adjusted past the point which shows LCM of noise with the front panel sensitivity control on its maximum setting.

B. Calibrator Section:

1. Output Adjustment:

- a. Direct couple output of calibrator to input Hewlett-Packard type oscillograph-oscilloscope.
- b. Set PQ switch to 100 PQ
- c. Adjust trim pot (A5R4 to give 1 volt peak-to-peak amplitude.



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ACCESSORY PANEL
68C-A1

DESCRIPTION:

The 68C-A1 panel provides the signal for the X-Y recorder's "Y" channel, and the peak reading picocoulomb meter.

The DVM and the X-Y recorder do not affect the operation of the scope but they must be used in conjunction with the scope.

The X-Y recorder displays the corona amplitude on the Y axis. This is automatically calibrated when the scope is calibrated. I.e., if the scope is calibrated for 40 PC/CM the X-Y recorder is calibrated at 40 PC/in.

The peak reading picocoulomb meter is calibrated separately using the picocoulombs displayed on the CRT by the calibrator.

OPERATION:

With the scope and calibrator turned on, turn the A1 power switch on and the X-Y recorder on (power switch located in the lower left hand corner of recorder).

Set scope to desired sensitivity. Since the scope gain controls the X-Y recorded gain, the recorder will read the same PC/in as the scope reads PC/CM. The X axis full scale reading will be the same as the full scale reading of the KV meter on the scope.

To calibrate the PC meter, set the meter (using the calibrating pot directly under the meter) to display the value in milivolts as shown on the scope calibrator switch. I.e., if the calibrator is set at 100 PC set the meter to 100 milivolts.

The system is linear as long as the display on the CRT does not exceed 3 CM.

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INSTRUCTION ADDENDUM REV.F. CORONA DETECTOR MODEL CDO - 68 C

Addition of meter relay as an option

A Weston meter relay Model 1945 is substituted for a standard kilovolt meter. Three labelled terminal positions on the rear of the scope are the meter relay contacts. When voltage rises past the meter set point, these contacts change state.

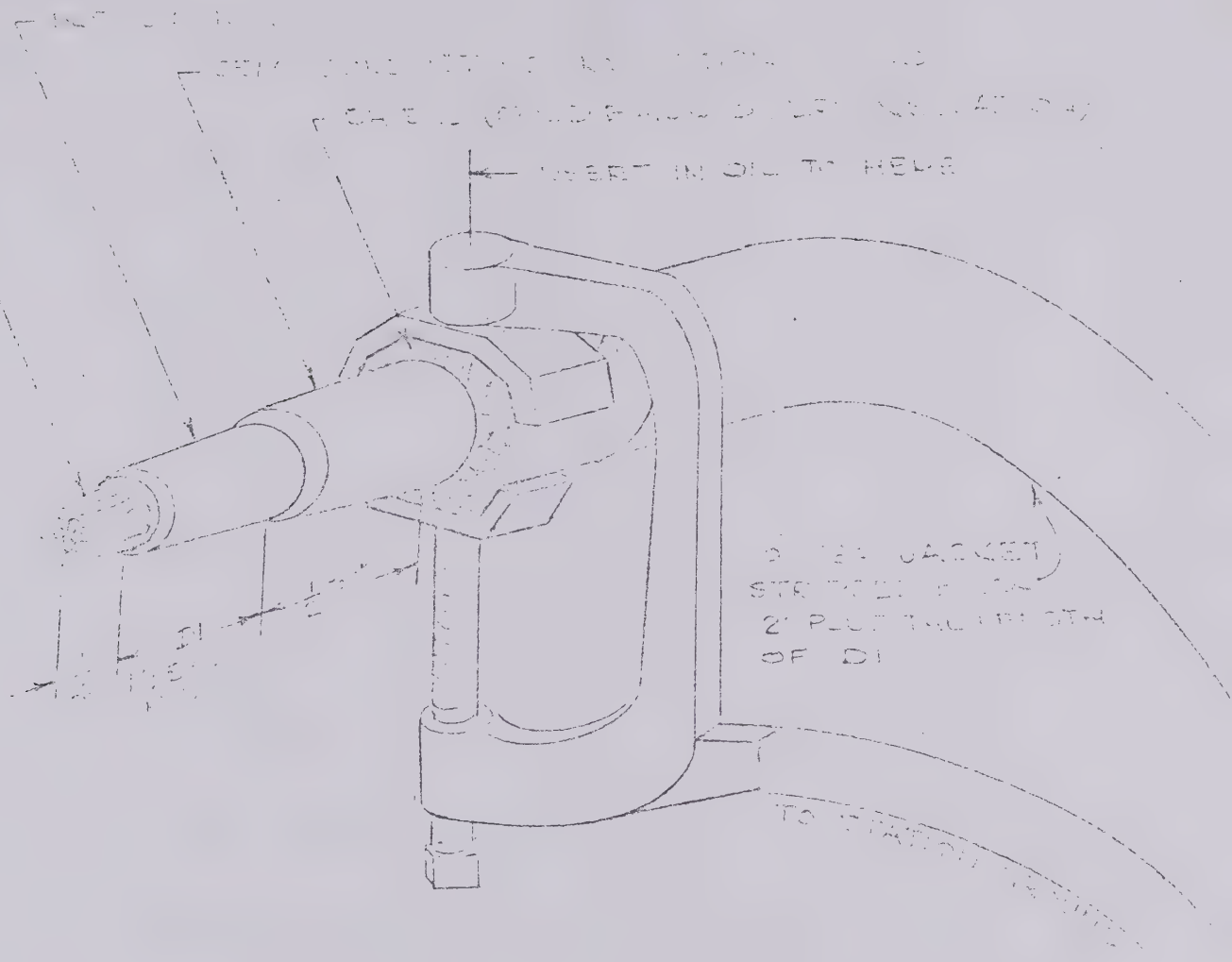


FIG. 1. CABLE SCREENING DETAIL FOR OIL CUP TERMINATION

A1-----Pre amplifier printed circuit board Dwg. DF30-132-C
(DF30-201-New#)

AlC1,2,10-----Capacitor, .01 uf @ 1 KV
AlC3-----Capacitor, 470 pf @ 1 KV
AlC4,9-----Capacitor, .1 uf @ 50 V
AlC5-----Capacitor, 4 uf @ 250 VDC
AlC6-----Capacitor, 240 pf @ 1 KV
AlC7-----Capacitor, 100 pf @ 1 KV
AlC8-----Capacitor, 60 uf @ 25 VDC
AlC11-----Capacitor, 47 pf @ 1 KV
AlCR 1,2-----Diode, 1N 4820
AlFL1-3-----Filter, 15-40 Mhy, Miller 5.1K, 2W

AlR1,2-----Resistor, 15 K, 1/2 W
AlR3-----Resistor, 100 K, 1/2 W
AlR4,13-----Resistor, 220 ohm, 1/2 W
AlR5,6-----Resistor, 10 K, 1/2 W
AlR7-----Resistor, 1 K, 1/2 W
AlR8-----Resistor, 4.7 K, 1/2 W
AlR9,10-----Resistor, 22 K
AlR11-----Resistor, 5.1K, 2W
AlR12-----Resistor, 47 K, 1/2 W

AlV1-----Tube, Nuovistor, RCA 7895
AlV2-----Tube, RCA 6J6A

A2-----KHZ filter assy, see Dwg. AA-18-124 for assy.
See Dwg. CF 30-132B for PC board (CF30-200-New #)

A2C1-----Capacitor, 100 pf @ 1 KV
A2C2-----Capacitor, 240 pf @ 1 KV
A2C3-----Capacitor, 470 pf @ 1 KV

A2FL1-----Filter, RF, U&C, FR-5 RY22ZZ
A2FL2-----Filter, RF, Triad FL-421

A2R1-----Resistor, 22 K, 1/2 W

A2S1-----Switch, Rotary, DP3T, CRL PA-2, Deck, CRL PA-300 shaft

A3-----Final amplifier printed circuit board Dwg. DF-30-132D
(DF30-202-New#)

A3C1,7,10 ----Capacitor, .1 uf @ 50 V
A3C2-----Capacitor, .01 uf @ 1 KV
A3C3,4,5-----Capacitor, 100 pf @ 1 KV
A3C6-----Capacitor, 240 pf @ 1 KV
A3C8-----Capacitor, 4 uf @ 250 VDC
A3C9-----Capacitor, .015 uf @ 400V
A3R1,6-----Resistor, 47 K, 1/2 W
A3R2,10-----Resistor, 1 K, 1/2 W
A3R3-----Resistor, 100 K, 1/2 W
A3R4-----Resistor, Pot, 50 K, 1/2 W, Mallory MTC5461
A3R5-----Resistor, 10 K, 1/2 W
A3R7-----Resistor, 470 ohm, 1/2 W
A3R8-----Resistor, 68 K, 1/2 W
A3R9-----Resistor, 15 K, 2 W
A3R11-----Resistor, 8.2 K, 1 W
A3R12-----Resistor, 33 K, 1/2 W
A3R13-----Resistor, 33 K, 2 W
A3R14-----Resistor, 180 ohm, 1/2 W

A3V1-3-----Tube, 6AU6

A4-----Power Supply printed circuit board Dwg. DF & DS 30-132A Rev A
(DF&DS30-199-New#)

A4C1-----Capacitor, .033 uf @ 600 V
A4C2-----Capacitor, .022 uf @ 600 V
A4C3,4-----Capacitor, .027 uf @ 600 V, 10%
A4C5,9-----Capacitor, .1 uf @ 100 V
A4C6,8,10----Capacitor, .1 uf @ 400 V
A4C7,12,17,23-Capacitor, .01 uf @ 1 KV
A4C11-----Capacitor, .15 uf @ 100 V
A4C13-----Capacitor, 20 uf @ 350 VDC
A4C14-----Capacitor, 30 uf @ 250 VDC
A4C15,16,22---Capacitor, 4 uf @ 250 VDC
A4C18-----Capacitor, .001 uf @ 6 KV
A4C19,20-----Capacitor, .1uf @ 5 KV
A4C21-----Capacitor, .002 uf @ 6 KV

A4CR1-4-----Diode, 1N4820
A4CR5-----Diode, Zener, 1N2846
A4CR6,7-----Diode, Hipotronics 7.5-5A
A4CR8-----Diode, Zener, ZA200A, 8 in series

A4F1-----Fuse, 3 amp, 3AG

A4L1-----Choke, DC, Stancor C-1003

A4R1-----Resistor, 25 K, 10 W

A4R2-----Resistor, Pot, 500 K, 2 W

A4R3-----Resistor, Pot, 100 K, 2 W

A4R4,5,12,13--Resistor, 47 K, 1/2 W

A4R6,7-----Resistor, Pot, 1 M, 1/2 W

A4R8,9,10,18

20-----Resistor, 560 K, 1/2 W

A4R11-----Resistor, 1 K, 10 W

A4R14-----Resistor, 10 M, 2 W

A4R15-----Resistor, 270 K, 1 W

A4R16-----Resistor, 24 K, 1/2 W

A4R17-----Resistor, 330 K, 1/2 W

A4R19-----Resistor, 2.2 M, 2 W

A5-----Pulse calibrator printed circuit board Dwg. DF30-124

A5C1-----Capacitor, 2 uf @ 200 V

A5C2,3-----Capacitor, 250 uf @ 25 VDC

A5C4-----Capacitor, 470 pf @ 1 KV

A5C5-----Capacitor, .001 uf @ 1 KV

A5C6-----Capacitor, .02 uf @ 50 V

A5C7-----Capacitor, .22 uf @ 25 V

A5C8-----Capacitor, 120 pf @ 1 KV

A5C9-----Capacitor, .1 uf @ 50 V

A5CR1-5-----Diode, 1N4820

A5CR6-----Diode, Zener, ZA-11B

A5CR7-----Diode, 1N3605

A5NE1-----Neon, NE-2

A5Q1-----Transistor, 2N2160

A5Q2-----Transistor, 2N2925

A5Q3,4-----Transistor, 2N3605

A5Q5-----Transistor, 2N3416 or 2N1893 (substitute)

A5R1-----Resistor, 510 ohm, 1 W
A5R2-----Resistor, 820 ohm, 1/2 W
A5R3,13-----Resistor, 100 ohm, 1/2 W
A5R4-----Resistor, Pot, 250 ohm, 1/2 W, Mallory MTC-251L1
A5R5-----Resistor, 390 ohm, 1/2 W
A5R6-----Resistor, 220 Ohm, 1/2 W
A5R7-----Resistor, 100 K, 1/2 W
A5R8,16-----Resistor, 2.2 K, 1/2 W
A5R9,10,17----Resistor, 10 K, 1/2 W
A5R11,15-----Resistor, 470 ohm, 1/2 W
A5R12-----Resistor, 22 K, 1/2 W
A5R14-----Resistor, 30 K, 1/2 W

A5T1-----Transformer, Triad F94X

A6-----Pulse calibrator range switch assy, Dwg. BA-18-122 and
CF30-124A (CF30-203-New #)

A6R1-----Resistor, 130 ohm, 1/2 W, 1% plus 10 K, 1/2 W, in parallel
A6R2-----Resistor, 143 ohm, 1/2 W, 1%
A6R3-----Resistor, 100 ohm plus 200 ohm, 1/2 W, 1%, in series
A6R4-----Resistor, 600 ohm, 1/2 W, 1%
A6R5,7-----Resistor, 45.3 ohm, plus 46.4 ohm, 1/2 W, 1%, in series
A6R6,8-----Resistor, 402 ohm plus 340 ohm, 1/2 W, 1%, in series
A6R9-----Resistor, 82.5 ohm, 1/2 W, 1%
A6R10-----Resistor, 33 ohm, 1/2 W
A6R11-----Resistor, 220 ohm, 1/2 W

A6S1-----Switch, Rotary 3P8T, composed of selector assy. .
CRL PA-300 decks CRL PA-1 and CRL PA-0 (2 req.)

A7-----Front panel assembly Dwg. DA-18-127

A7C1-----Capacitor, .22 uf @ 100 v

A7M1-----Meter, Weston, 50 ua Optional: Md1 1945 Meter Relay

A7PL1,2-----Pilot Light, Drake R118
A7PL3,4-----Lamp Gratide Illumination, Jan 100326, #327 bulb

A7R1-----Resistor, Pot, 50 K, 2 W, 1RC U-35
A7R2,3-----Resistor, Pot, Dual 1M, 2 W, A-B JD1N056S105MA
A7R4-----Resistor, Pot, 50 ohm, 2 W, A-B RV4NAYSD500A
A7R5,6-----Resistor, Pot, 1 M, 2 W, A-B RV4NAYSD105A
A7R7-----Resistor, Pot, 100 K, 2 W, A-B RV4NAYSD104A
A7R8-----Resistor, Pot, 5 K, 2 W, A-B RV4NAYSDS02A
A7R9-----Resistor, 20 K, 1/2 W
A7R10-----Resistor, 220 K, 1/2 W

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MA33507